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Precision Range Integrated Maneuver Exercise (PRIME) User's Guide

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This report is a user-oriented document on the Precision Range Integrated Maneuver Exercise (PRIME) device-based training system. It is intended for use by armor and mechanized infantry units considering using PRIME to meet their gunnery and tactical training needs. The User's Guide consists of two chapters, an appendix, and a glossary. The first chapter describes the PRIME system, including system operation, subsystems and elements, and site organization. The second chapter provides guidance for planning, implementing, and evaluating individual, crew, and platoon-level training using PRIME. Appendix A assists unit leaders in selecting tank platoon-level tasks for PRIME training. The glossary defines the acronyms and abbreviations used in the Guide.

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Precision Range Integrated Maneuver Exercise (PRIME) User's Guide

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FOREWORD

The Precision Range Integrated Maneuver Exercise (PRIME) is a device-based training system founded on the U.S. Army's primary training principle, "Train as you fight." The purpose of PRIME is to support armor and mechanized infantry units in individual, crew, and platoon-level tactical and gunnery skills training. What distinguishes PRIME from similar device-based training systems is its automated data collection, analysis, and feedback capabilities. PRIME provides detailed records of unit tactical and gunnery performance that can be used to provide immediate feedback during training and subsequent feedback during a unit's after-action review (AAR).

This Guide presents preliminary training guidance to support the integration of PRIME into armor and mechanized infantry unit training programs. The intended audience of this User's Guide is unit leaders at the platoon, company, and battalion levels. The sponsor for this work, which was performed under the auspices of the ARI Fort Knox Field Unit, was the Project Manager for Training Devices (PM TRADE). The research task that supports this mission is titled "Effective Tank Gunnery Training Strategies," organized under the "Training for Combat Effectiveness" program area.

Development of the PRIME User's Guide is part of an ongoing effort at the Fort Knox Field Unit to optimize combat readiness by using simulations and persuasive justification of training resources. The guide has been briefed to PM TRADE and the Directorate of Training and Doctrine (DOTD), U.S. Army Armor School (USAARMS) personnel. The Guide is being used by unit leaders from the 3rd Infantry Division (3ID), U.S. Army Europe (USAREUR) in fielding PRIME. It is also being used for the development of PRIME instructional videotapes.

EDGAR M. JOHNSON
Technical Director

PRECISION RANGE INTEGRATED MANEUVER EXERCISE (PRIME) USER'S GUIDE

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PREFACE

The purpose of this User's Guide is to support the integration of the Precision Range Integrated Maneuver Exercise (PRIME) device-based training system into armor and mechanized infantry unit training programs. The intended audience of the User's Guide is unit leaders at the platoon, company, and battalion levels. These leaders should use this Guide whenever PRIME is selected to help meet unit training needs.

The User's Guide contains two chapters, an appendix, and a glossary. The first chapter provides a general description of the PRIME system, including system operation, components, site organization, and major capabilities and limitations. The second chapter provides guidance on how unit leaders can plan, implement, and evaluate PRIME training. The appendix (Appendix A) provides unit leaders with assistance in selecting tank platoon-level tasks for PRIME training. The glossary defines the acronyms and abbreviations used in the Guide.

Several points need to be remembered when using this Guide. First, there is no set way to train using PRIME. Training using PRIME depends on the creativity and imagination of unit leaders. PRIME provides the tools to improve and sustain individual, crew, and unit performance but it is up to unit leaders to take full advantage of these tools. Unit leaders should develop PRIME training exercises that capitalize on the system's capabilities while working around its limitations. This Guide is a starting point to help unit leaders use PRIME to meet their unit training needs.

Secondly, this Guide is not intended to stand alone. It does not give complete details on operating the equipment components that constitute the PRIME system. Unit leaders should use this Guide in conjunction with Army Training and Evaluation Program (ARTEP) Mission Training Plans (MTPs) and other documents that guide unit training programs. The Guide should also be used in conjunction with user orientations, equipment manuals, operator's guides, and other materials available at the PRIME site.

Finally, PRIME is a developing system. Its specific capabilities will vary over time and across sites. This Guide describes PRIME capabilities at the present time. Unit leaders should consult with PRIME site personnel to obtain up-to-date information on system capabilities and limitations established at each site.

The proponent for this publication is the Project Manager for Training Devices (PM TRADE). Changes to this document should be submitted on Department of the Army (DA) Form 2028 (Recommended Changes to Publications and Blank Forms) and forwarded to LTC Richard L. Peters, PM TRADE, ATTN: AMCPM-GFD, 12350 Research Parkway, Orlando, FL 32826-3276.

CHAPTER 1 - PRIME DESCRIPTION

1.1 Introduction. Precision Range Integrated Maneuver Exercise (PRIME) is a device-based training system being procured by the Project Manager for Training Devices (PM TRADE) for both armor and mechanized infantry units. PM TRADE is procuring PRIME to enhance the technical capabilities provided by the basic Multiple Integrated Laser Engagement System (MILES), the Laser Target Interface Device (LTID), and the Automatic Tank Target System (ATTS). The technical enhancements of PRIME include (a) an improved MILES (I-MILES), (b) a Global Positioning System (GPS), (c) a Thru-Sight Video (TSV) subsystem, and (d) a Range Control Computer (RCC).

a. Purpose. The purpose of PRIME is to support individual, crew, and platoon-level tactical and gunnery skills training in the areas of fire distribution, maneuver, command and control, and target acquisition. It achieves this purpose by providing units with objective and near real-time data collection and analysis for immediate feedback during training and subsequent feedback during a unit's after-action review (AAR). In general, PRIME is a means whereby armor and mechanized infantry units can conduct training in these areas under conditions that replicate collective task performances in a combat environment.

b. Capabilities and Limitations. The PRIME system can be used to support both individual training and the collective training of crews and platoons. It provides units with a means to train many but not all of its collective tasks. It can be used to train some collective tasks better than others, and some not at all. The major capabilities and limitations that affect training using PRIME are described below.

1. Capabilities. The primary advantages in training with PRIME include:

(a) Training preparation. PRIME can be used by units in preparation for Tank/Bradley Fighting Vehicle (BFV) live-fire gunnery (Combat Tables VII thru XII). It can also be used in preparation for unit tactical training during Situational Training Exercises (STXs) or Field Training Exercises (FTXs).

(b) Training feedback. PRIME can be used by units to provide immediate feedback during training and subsequent feedback during the AAR. The training feedback capabilities of PRIME include computer printouts providing formatted gunnery and tactical exercise reports, a computer generated imagery (CGI) Graphics Map Display, and TSV tapes with audio recording.

(c) Realism. PRIME can provide most of the effects created by a 360-degree battlefield and stress of combat. PRIME instrumented vehicles can kill and be killed by opposing forces. Unit vehicles and other assets can be disabled or destroyed based upon personnel actions. Vehicles maneuvering on PRIME are also not restricted to roads but can travel freely over the terrain.

2. Limitations. The primary disadvantages in training with PRIME include:

(a) Terrain. Although PRIME allows units to freely maneuver over the terrain, there are certain restrictions due to the emplacement of targets and fire effect simulators. The area immediately around each target and fire effect simulator must be marked off to prevent damage or injury to unit personnel. Also, constant use of the PRIME maneuver area or range can channel units through previously used lanes, avenues of approach, and areas of cover and concealment.

(b) Precision gunnery. PRIME is limited in the training of precision gunnery engagement procedures until the Tank Weapons Gunnery Simulation System (TWGSS)/Precision Gunnery System (PGS) is developed and integrated with PRIME. TWGSS/PGS (PGS is the BFV version) is vehicle-appended and interfaces with the vehicle fire control system to permit precision and degraded mode gunnery to be accomplished, taking into account lead, superelevation, range, and ammo type. The training limitations of PRIME are the same as those present with MILES. For example, gunners cannot lase to targets to determine range and respond to multiple range returns, relay on target following reticle shift, or dump lead following target engagement rules.

(c) Combined arms training. PRIME is intended to support individual, crew and platoon-level tactical and gunnery skills training. As such, collective training which is jointly conducted by associated combat, combat support and combat service support units is not well represented.

(d) Resource costs. The estimated annual costs of operating PRIME approach one-half million (FY90) dollars. This figure come from estimated costs for personnel to operate PRIME at Fort Hood, as provided by the staff of the III Corps Assistant Chief of Staff, G3 (Operations and Plans). It does not include the other costs associated with range construction and maintenance, fuel, pyrotechnics, contract logistics support (CLS), vehicle maintenance, equipment repair and replacements, or PRIME system component repair and replacements.

(e) Quantity of data. PRIME provides units with a variety of data and media for review and use in their AARs. Unit leaders who are not adequately prepared to use the computer printouts, CGI Graphics Map Display and individual crew TSV tapes may become overwhelmed and confused, initially. However, with practical experience using PRIME and assistance from AAR support personnel, unit leaders can learn how to manage the data and media available for the AAR.

c. Overview. This chapter provides a general description of PRIME (a) system operation, (b) subsystem and elements, and (c) site organization. Further details on PRIME can be obtained from the equipment manuals, operator's guides, standing operating procedures (SOPs), and other materials available at the PRIME site.

1.2 PRIME System Operation. The operation of the PRIME device-based training system is illustrated in Figure 1 and described in the following paragraphs.

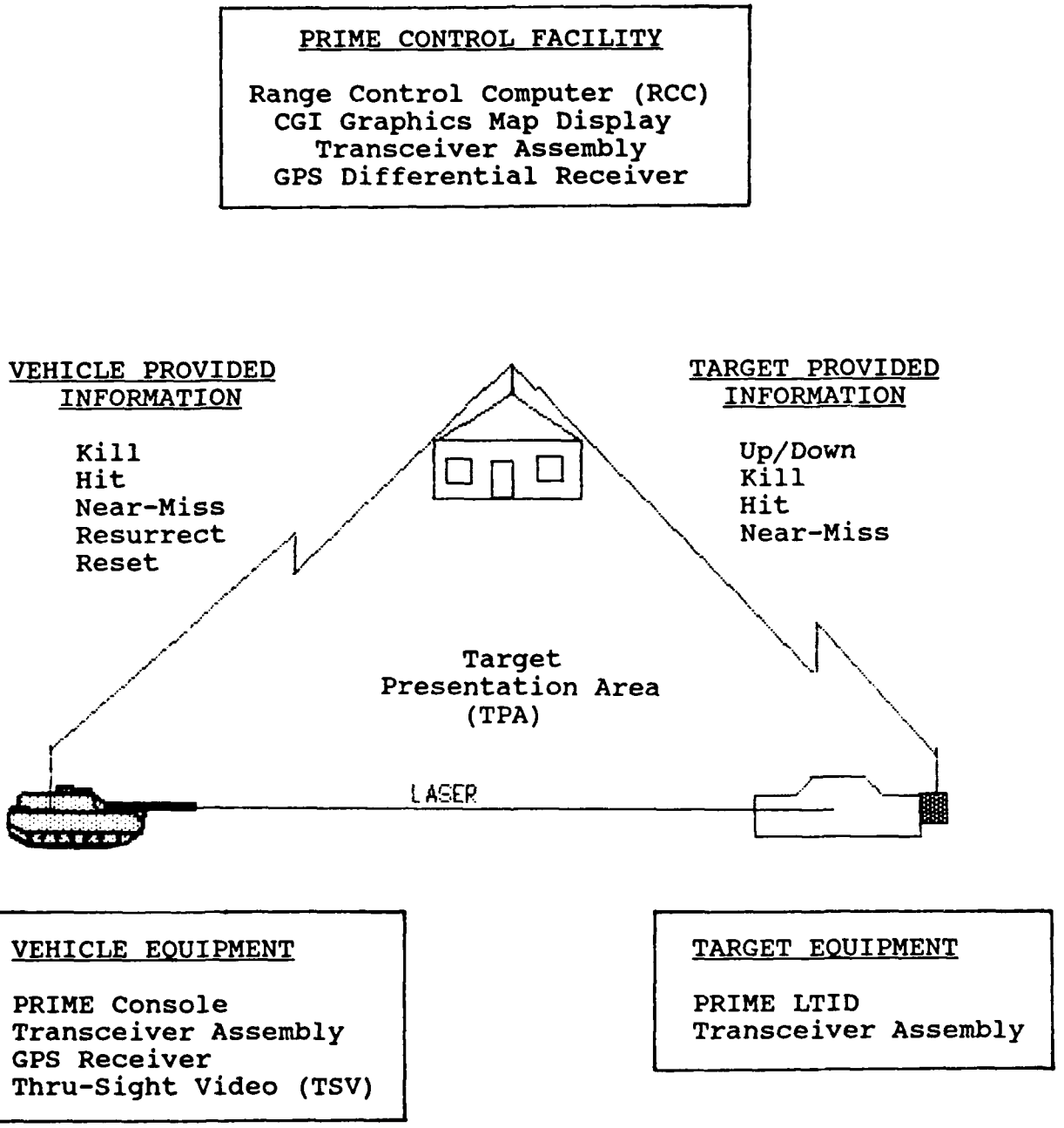

Figure 1. PRIME operation.

Before the start of a PRIME exercise, the unit commander provides the RCC operator with a detailed set of instructions for setting-up the range. These instructions include: (a) the type, location and number of targets to be presented in the exercise; (b) the TPA for each target; (c) the type of weapon system and ammunition load for each target and vehicle; (d) the target-up, target-down and target shoot-back times; (e) the connection or link between targets; and (f) the depleting target array. The instructions are programmed in the RCC and become the initialization data that the C&C subsystem transmit by radio frequency to each vehicle and target.

During a PRIME exercise, the RCC requests (polls) each vehicle to transmit its location and status. At the same time it polls each target to transmit its status, up or down. This polling of vehicles and targets by the RCC takes place every three to five seconds and occurs continuously throughout a training exercise.

When the RCC determines that a vehicle has entered a TPA, it signals targets with that TPA to come up. The targets transmit or report back their status, up or down, at the next polling. When a target reports it's still down, the RCC will automatically signal an alternate, initialized target with that TPA to come up.

A vehicle engages a target by sending out (firing) an I-MILES laser beam which contains its weapon and vehicle identification codes. The engagement data (weapon and vehicle identification codes, firing time) are stored in the vehicle's PRIME console and then transmitted to the RCC at the next polling.

The target's PRIME LTID determines whether the I-MILES laser beam is strong enough to register a hit. If a hit is registered, it then determines the outcome of the engagement; the target is killed, hit but not killed, or near-missed. The PRIME LTID makes this determination by entering into a Monte Carlo routine (chance table) that is based on weapon fired and target vulnerability. Accordingly, it signals the target to respond (stay up or fall). The engagement data (weapon and vehicle identification codes, engagement time, and engagement outcome) are then transmitted to the RCC at the next polling.

If a target is not killed within the time standard set by the unit's initialization data, the RCC signals the vehicle to record an I-MILES hit from the target. This causes the vehicle's PRIME console to enter into a Monte Carlo routine to determine the outcome of the target engagement. The vehicle's PRIME console will respond accordingly and then transmit the results to the RCC at the next polling.

During a PRIME exercise, all vehicle movements (time-coded vehicle position locations), engagements, and engagement outcomes are stored in the RCC. At the end, the data are down-loaded onto a computer diskette and provided for use during the unit's AAR.

1.3 PRIME Subsystems and Elements. The PRIME training system is composed of five subsystems. These subsystems and elements (See Figure 2) are described in the following paragraphs. A more detailed description of each subsystem's elements can be found in the operator's manual, equipment manuals and other publications available at the PRIME site.

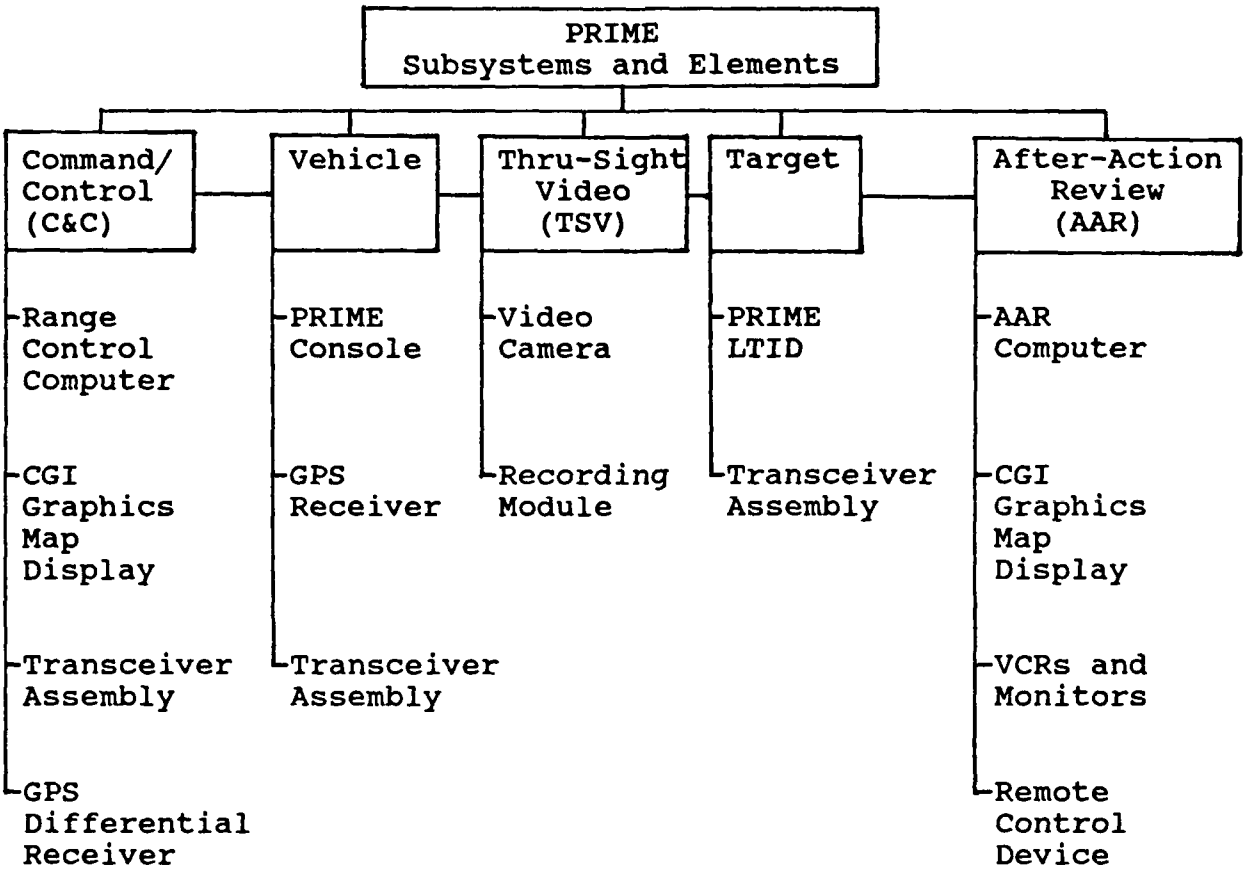

Figure 2. PRIME subsystems and elements.

a. Command and Control (C&C) Subsystem. The C&C subsystem consists of a Range Control Computer (RCC), CGI Graphics Map Display, transceiver assembly, and a GPS differential receiver.

(1) Range Control Computer (RCC). Before the start of a PRIME training exercise, the RCC is used to initialize the range set-up instructions provided by the unit commander to integrate and control all participating vehicles and targets. The RCC initialization data include designating a TPA for each target in the offense, giving each target its sequence of presentation in the defense, designating each target as a type of vehicle, specifying return fire criteria for each target, and providing hit/kill probabilities for each weapon system and target combination.

During a PRIME training exercise, the RCC is used to link, control and direct all the other components of PRIME. It polls each vehicle every three to five seconds to transmit its location and status, and each target to transmit its status, up or down. It determines when a vehicle enters a designated TPA and signals primary or alternate targets with that TPA to come up. When a target is not killed within the time standard set by the unit's initialization data, it signals the vehicle to record an I-MILES hit from the targets. When necessary, manual commands can be given to control the targets (targets up/down and hostile fire simulator) and the vehicles (hit, kill, near miss, reset, and resurrect) using its interactive, on-line menu. Finally, it collects and stores all vehicle movements, engagements, and engagement outcomes.

At the end of a PRIME training exercise, the RCC is used to analyze all engagement data and provide formatted or custom event reports for use during a unit's AAR. Data stored in the RCC can also be down-loaded onto a diskette and used to replay the entire training exercise on the CGI Graphics Map Display.

(2) CGI Graphics Map Display. The CGI Graphics Map Display takes data available in the RCC and superimposes the vehicle and target information on a high resolution color map display of the range. This tactical map can include grid lines, elevation lines, vegetation, and depressions. The purpose of the CGI Graphics Map Display is to provide a pictorial representation of crew and platoon tactical and gunnery engagement activities that occur during a PRIME exercise. As such, it can be used by unit leaders in monitoring and controlling a PRIME training exercise or in providing training feedback during the unit's AAR.

(3) Transceiver Assembly. The transceiver assembly interfaces with the RCC to provide a two way radio frequency data communications telemetry network to and from the vehicle and target subsystems.

(4) GPS Differential Receiver. The GPS differential receiver provides correction factors to position location data received from the vehicle GPS receiver, thereby achieving a more accurate position location for each vehicle. The corrected position location data is transmitted to the RCC for use in target presentation, display on the CGI Graphics Map Display and the production of formatted gunnery and tactical exercise reports for unit AARs.

b. Vehicle Subsystem. The vehicle subsystem consists of the PRIME console, GPS receiver and a transceiver assembly. The GPS receiver and transceiver assembly must be installed by the PRIME instrumentation technicians. NOTE: The initial installation of the vehicle subsystem components takes time and should be considered by the unit commander when planning to use PRIME for unit training.

(1) PRIME Console. The PRIME console replaces the unit's standard MILES console. It provides the same basic functions and control as MILES, but interfaces to the PRIME telemetry and position location networks through the vehicle transceiver assembly. NOTE: The unit must bring its own MILES equipment for its vehicles. Range personnel will replace the unit's MILES console with the PRIME console.

The PRIME console receives and stores initialization data from the RCC. The initialization data configure the MILES system and include:

(a) type of vehicle (e.g., M1, M2/M3, T-72, T-80, BMP, M60, etc),

(b) MILES weapons messages (e.g., TOW, 105mm, 120mm, 25mm, etc),

(c) number of rounds for each weapon system, and

(d) time synchronization of the PRIME console's internal clock to that of the RCC's internal clock for a common time code.

Each PRIME console has a unique player identification code that is integrated into the MILES laser beam. This provides I-MILES with player identification capabilities. It records all engagement events and tags them with time and position location. As updates are received from the vehicle position location device, they are time-tagged in the PRIME console. When the console receives instructions to transmit data (polling cues) from the RCC, it transmits recorded data, in near real-time, back to the RCC for display, recording, and processing.

The PRIME console also receives and processes target shoot-back commands and manual commands from the RCC. Shoot-back commands simulate that the vehicle is being engaged by a target. In this situation, the RCC sends a command of (a) near miss the vehicle, (b) hit the vehicle and enter the vehicle Monte Carlo routine, or (c) kill the vehicle. The PRIME console translates these commands into MILES actions, just as if the vehicle had received a MILES laser weapon message. The additional manual commands of reset and resurrect also can be sent from the C&C subsystem's RCC to the PRIME console. The manual command "reset" causes the PRIME console to change all values to those at the start of the PRIME exercise (initialization data). The manual command "resurrect" brings the vehicle back to life.

(2) GPS receiver. The GPS receiver is a position location device that continually reports the position of the vehicle with an accuracy of plus or minus ten meters to the C&C subsystem's GPS differential receiver.

(3) Transceiver assembly. The vehicle transceiver assembly interfaces with the PRIME console to provide a two way

radio frequency data communications telemetry network to and from the C&C subsystem's transceiver assembly.

c. Thru-Sight Video (TSV) Subsystem. The TSV produces a videotape of the gunner's sight picture with an audio recording of the crew interaction during the training. The TSV is composed of a video camera linked to the gunner's primary sight extension (GPSE) and wired to an recording module which enables the sight picture observed by the gunner to be recorded. This recording module contains a VCR, power source and a video time/date generator synchronized with the RCC for a common time code. This video time/date generator creates a visual indicator of the date and time on the video recording and an indication of the instant the gunner pulls the trigger. NOTE: Installing the TSV into each vehicle takes time and should be considered by the unit commander in planning PRIME training.

d. Target Subsystem. The PRIME target subsystem interfaces the RCC with the site's targetry. The target subsystem consists of a PRIME LTID and a target radio transceiver assembly.

(1) PRIME LTID. The PRIME LTID is a modified MILES LTID. It provides the enhanced PRIME capabilities (vehicle identification, adjustable vulnerabilities, etc.), but can still be used (switch selectable) as a standard MILES LTID. The PRIME LTID also has a sensor that determines whether the target is up or down. Target status (up/down) is continuously transmitted by the target subsystem's PRIME LTID to the RCC.

(2) Transceiver assembly. The target transceiver assembly interfaces with the PRIME LTID to provide a two way radio frequency data communications telemetry network to and from the C&C subsystem's transceiver assembly.

(3) ATTS. Although an integral part of the PRIME site, the ATTS is not actually part of PRIME but is integrated into the PRIME system through the PRIME LTID. This component consists of more than just the ATTS. It also includes the (a) thermal blankets, (b) hostile fire simulators (Hoffman devices), and (c) target silhouettes. This equipment is currently available in the Army target device inventory for tank/BFV) gunnery. PRIME range personnel will integrate the target subsystem from existing supplies and incorporate it into the PRIME site.

(4) Summary. The target assemblies are controlled through a PRIME LTID connected to the ATTS mechanism. The PRIME LTID responds to the I-MILES codes from the vehicle firing system and causes the target to fall. The target transceiver assembly interfaces with the PRIME LTID to provide a two way radio communications network to and from the C&C subsystem's transceiver assembly. Targets can also be manually raised or dropped by the RCC operator. In summary, the target and vehicle subsystems interface with the RCC to provide enhanced engagement and casualty assessment simulation and target control.

e. After-Action Review (AAR) Subsystem. The purpose of the PRIME AAR subsystem is to provide objective feedback that can be used by unit leaders to identify and remediate tactical and gunnery training deficiencies. One of the distinct advantages of the PRIME system is the data provided for feedback and the means for delivering that feedback to the individual, crew or unit.

The PRIME AAR subsystem consists of (a) an AAR computer, (b) printer, (c) a CGI Graphics Map Display, (d) four to six VCRs and monitors, and (e) a hand-held remote control to synchronize the playback of the VCRs. This equipment is contained in a separate facility located on the PRIME site and operated by PRIME support personnel. The AAR support staff is there to assist unit leaders in the preparation and presentation of their AARs.

(1) AAR Computer. The AAR computer can be used for replaying unit training exercise data on the CGI Graphics Map Display and in producing exercise reports on the computer printer. The AAR computer is identical to the RCC and can be used as a replacement to continue training operations at the PRIME site, if required.

(2) AAR Computer Printer. The AAR computer printer can be used to provide leaders with a hard-copy record of engagement events that occurred during a PRIME exercise. Formatted gunnery or tactical exercise reports (printouts) can be selected and printed using the on-line computer menu. As mentioned earlier, these reports can provide unit leaders with a summary of the platoon's tactical proficiency by vehicle as well as individual or crew gunnery proficiency in accomplishing its mission.

(3) CGI Graphics Map Display. The CGI Graphics Map Display can be used by unit leaders to review all or selected parts of the PRIME training exercise. As mentioned earlier, the Graphics Map Display superimposes vehicle and target information on a high resolution color tactical map display of the range. As such, unit leaders can replay the position and activities (movement and engagements) of all vehicles and target status (up or down) during each phase of the unit's training exercise.

(4) VCRs and Monitors. The VCRs and monitors can be used to show the TSV tapes recorded at each vehicle during a PRIME exercise. As mentioned earlier, the TSV tapes contain everything seen by the tank/BFV gunners and said by the crews. As such, unit leaders can review the tapes to highlight individual and crew strengths and weaknesses during the exercise. Rather than showing the TSV tapes in their entirety during an AAR, unit leaders can take the tapes back to their unit for total review.

(5) VCR Remote Control Device. The VCR remote control can be used to synchronize TSV tapes recorded at each vehicle. Thus, unit leaders can simultaneously review the tactical and gunnery activities of all vehicles/crews during a PRIME exercise.

1.4 Site Organization. The organization of a PRIME site will vary from location to location. The key components, functions and personnel that should be available at each site are described in the following paragraphs.

a. Range Operations Facility. This facility is used to house the office and equipment for PRIME range operations. The PRIME Range Operations Manager will use the facility to schedule and coordinate PRIME training with unit commanders, manage range operations during training exercises, and supervise support staff to include the target operators and servicers, RCC operators, AAR coordinators, and PRIME contract support technicians. The Range Operations Manager is responsible for operating the facility in accordance with range and safety constraints, establishing range policy and SOPs, conducting user orientations, and maintaining equipment manuals, operator's guides, SOPs and other PRIME materials.

b. Instrumentation Area. The instrumentation area is used by the technicians so that they can rapidly install and service the PRIME equipment. This is not a tactical area and may be illuminated during hours of darkness to meet unit maintenance requirements. Presently, skilled contract personnel are located on site to install and maintain the various PRIME equipment in each vehicle. Units will be notified by the Range Operations Manager when instrumentation support is available. Since instrumenting the vehicles takes time, unit leaders should forecast such time in their planning for PRIME training.

c. PRIME Control Facility. This facility is used to house the C&C subsystem equipment and components required for PRIME training. The RCC operator will use the climate controlled facility and equipment to initialize the unit commander's range set-up instructions for training exercises, control and monitor PRIME system operation during training implementation, respond to unit commander requests (e.g., raise or lower targets, stop or restart an exercise), and provide hard-copy computer printouts of engagement events that occurred during a PRIME exercise. The unit commander, or personnel designated to serve as liaison with the RCC operator, can be located in the facility to monitor events on the Graphics Map Display and control PRIME training.

d. Target Servicer Area. The target servicer area is used for the repair and servicing of targets and target lifters and is controlled by the Range Operations Manager. As with most ranges, the using unit may have to assist the target servicers with a target detail. The Range Operations Manager will inform the unit if this is a requirement.

e. AAR Facility. The AAR facility is used to house the AAR computer, a CGI Graphics Map Display, and four to six VCRs and monitors for playing the TSV tapes. The AAR facility is climate controlled and has seating room for a platoon-sized unit. The AAR coordinator will use the facility and equipment to assist unit leaders in preparing and conducting their AARs.

Chapter 2 - CONDUCTING PRIME TRAINING

2.1 Introduction. The PRIME device-based training system can provide armor and mechanized infantry units with objective and near real-time data collection and analyses of individual, crew and platoon tactical and gunnery performance. It enables units to train in freeplay exercises on a maneuver area instrumented to execute event driven scenarios and record individual, crew and unit task performance. It also adds stress to the battlefield environment by using both live and static targets with a shoot-back capability.

a. Key to PRIME training. The key to conducting effective and efficient PRIME training is how unit commanders and key leaders use the data provided by PRIME to identify individual, crew and platoon strengths and weaknesses and provide training feedback.

b. Overview. This chapter provides the basic knowledge unit commanders and key leaders need to plan, implement, and evaluate PRIME training. Acquiring the skills necessary to train using PRIME will take time, practice and feedback. With the knowledge provided herein, along with the help of the support staff located at the PRIME site, unit leaders can develop the skills necessary to conduct successful PRIME training.

2.2 PRIME Training Requirements.

a. Pre-conditions for training. With tank and BFV usage restricted, units training with PRIME must strive to obtain the most benefits for every mile travelled. To accomplish this, units leaders must know precisely what they want to train before they arrive at the PRIME site. They must also ensure that their soldiers have the individual, crew and unit prerequisite skills necessary to conduct such training. Units that fail to satisfy these two pre-conditions will lose much of PRIME's real value.

b. Preparation for Training. To make the most out of the training time available at PRIME, units should make certain that all key unit leaders receive PRIME orientation. In general, this orientation will provide them with an understanding of PRIME system operation, system components, training capabilities and limitations, layout of the range, and site facilities. Once knowledgeable about PRIME, unit leaders can then begin scheduling PRIME to meet their unit training requirements and start exercise planning with PRIME site personnel. By being fully prepared for PRIME training, as described in paragraph 2.5, units can conduct training almost immediately upon entering the PRIME site.

2.3 Levels of PRIME Training. PRIME provides units the rare opportunity to conduct multi-echelon training in a battlefield environment. With objective and near real-time performance data, PRIME is ideally suited to support training at the individual, crew and platoon level.

a. Individual training. The data provided by PRIME can be used to improve and sustain the gunnery and tactical skills of individual soldiers within a unit. Unit leaders can use the computer based printouts to examine marksmanship results (hits, kills, near-misses) with mean firing time by vehicle, vehicle vulnerability results (target shoot-back kills, misses) with mean shoot-back time, weapon selection and effective range, and ammunition conservation results by vehicle. By replaying pre-selected firing events on the CGI Graphics Map Display, unit leaders can work with platoon leaders and platoon sergeants to improve their skills in target acquisition, fire distribution, fire commands, reporting, and command and control of their vehicles. Similarly, by replaying the identical firing events recorded on the TSV tapes, they can work with vehicle commanders to improve their individual skills in target acquisition, issuing fire commands, vehicle control, and reporting. They can also work with vehicle drivers to improve their control and movement techniques and with vehicle gunners to improve their target scanning, tracking, aiming and engagement skills.

b. Crew training. The data provided by PRIME can also be used to enhance crew performance in much the same way as individual training. For crew-level training, however, the main focus should be on the interactive skills of crew members rather than the performance of individual skills. Unit leaders can use both the computer printout data and corresponding TSV tapes to improve and sustain crew skills. By replaying preselected firing events recorded on the TSV tapes, they can work with the crews to improve their skills in maneuver techniques, identifying targets in their assigned sector, target hand-off and giving crew fire commands. They can also work with the crews to improve their communications skills in reporting, transmitting, and receiving or relaying internal and external messages that are considered essential to effective crew performance.

c. Platoon training. Effective platoon-level training is a function of the tactical gunnery and maneuver skills of the individual crews and the command and control skills of platoon leaders. Again, the computer printouts provided by PRIME can be used to identify good performance in these skills and probable reasons for substandard performance. Unit leaders can use the computer printouts to examine the platoon loss exchange ratio (targets killed/vehicles killed), mean firing time, and by vehicle summaries for each firing event. By replaying selected firing events on the CGI Graphics Map Display, they can then work with the platoon leaders and vehicle commanders to improve and sustain their respective skills within a unit tactical and gunnery context.

2.4 PRIME Orientation. The operation of the PRIME system is not difficult to understand and the equipment components that make up the PRIME system are easy to use. All key unit leaders, however, must receive orientation training before they attempt to use PRIME. Before arriving at the PRIME site, unit leaders should be proficient in operating their own combat vehicles and systems.

This will allow the PRIME support staff to focus the training on major differences between PRIME and currently fielded systems. Unit commanders should schedule the appropriate orientation, as described in the following of paragraphs, through their chain of command with the PRIME Range Operations Manager.

a. First-time user's orientation. This orientation is intended for all key unit leaders who plan to use PRIME for the first time. The purpose of the orientation is to ensure unit leaders have a complete working knowledge of the PRIME system. The orientation will be conducted by PRIME support staff at the PRIME site and include hands-on demonstrations of how the system operates, the equipment components that make up the system, and the equipment located at the AAR facility for providing training feedback. The orientation will also include open discussions on the capabilities and limitations of PRIME for unit training, the maneuver area or range, and the site facilities. Unit leaders will be given initial guidance on how to plan and conduct PRIME exercises and provided a point of contact for PRIME operation. Prime User Guides, SOPs, operator manuals, and diagrams showing the range layout and site facilities will also be made available as part of the orientation program.

b. Refresher training. This training is to update any unit leader who has completed the first-time user's orientation and is planning to use PRIME in the next few weeks or month. The main purpose of the training is to ensure unit leaders have the latest information and materials available on the PRIME training system. The orientation training will be provided by staff members at the PRIME site and include a comprehensive review and update on the system's training capabilities and limitations. Training will be administered based on the immediate needs of unit personnel and the availability of PRIME site and staff.

2.5 Planning PRIME Training. Thorough planning is critical to conducting successful PRIME training. Without thorough training preparation, units should not expect to show up at the PRIME site and begin conducting useful training exercises. Unit leaders must plan for PRIME exercises as fully as they do for other STXs or FTXs. The planning steps that units need to complete to conduct PRIME training are described in the following paragraphs. For a more detailed discussion on planning training, refer to Field Manual (FM) 25-100, Training the Force.

a. Determine training needs. The first step in planning PRIME training is to determine the tasks that need to be trained. This determination must be made before selecting training methods designed to meet unit needs. The procedure used to complete this step is the same for PRIME as for any other collective training method. That is, unit leaders should review the unit's mission essential task list (METL) and assess information relating to unit proficiency. This assessment compares the unit's current level of proficiency with the desired level, as defined by Army Training and Evaluation Program (ARTEP) Mission Training Plans (MTPs) and other publications. The end result of this effort

will be a list of tasks that need to be trained to achieve and sustain desired levels of unit proficiency.

b. Select training methods. After the unit's training needs have been established, the next step in the planning process is to select the training methods that are capable of satisfying the training requirements. PRIME is one of several methods that unit commanders should consider in preparing vehicle crews for gunnery and platoons for gunnery and tactical exercises. For alternative methods, Armor commanders should review Training Circular (TC) 17-12-7, Armor Training Device Macrostrategy, which provides the current strategy for the use of fielded and programmed training devices, simulators, and simulations that affect Armor training. Mechanized infantry commanders should review similar documents that affect BFV training. The final decision to train with PRIME versus alternative training methods should be based upon unit training needs, resource availability and the strengths and weaknesses of each method.

c. Select tasks for PRIME training. Once the decision has been made to use PRIME to help meet unit training requirements, the next step in the planning process is to select tasks that are appropriate to train using PRIME. At this point, unit leaders should have completed the first time user's orientation on PRIME. As such, they will know the training capabilities and limitations of PRIME and be able to identify collective tasks that can be trained using PRIME. As described in the following paragraphs, PRIME can support the training of some collective tasks better than others and some not at all.

(1) Appendix A of this User's Guide provides assistance in selecting platoon-level tasks for PRIME training from ARTEP 17-237-10-MTP, Mission Training Plan for the Tank Platoon. The appendix separates these tasks into five categories: highly enhanced, partially enhanced, minimally enhanced, not supported, and PRIME not required. The tasks are separated based upon the amount of support PRIME can provide to commanders in conducting training on the task. Each task rating is accompanied by an explanation and some suggestions for using PRIME for training that task. Similar ratings can be made for infantry platoon-level tasks.

(2) The next to last rating category, "PRIME not required," may be somewhat confusing. This rating is given to tasks that can be trained using PRIME, but where the data collection and feedback capabilities of PRIME are not really needed. Tasks in this category could be described as "Yes it can be trained on PRIME, but why would you want to." For example, many of the platoon-level tasks from ARTEP 17-237-10-MTP are considered prerequisites or essential for performing other more complex tasks. An example of such tasks is "executing a wedge formation." This task is necessary for performing the more complex tasks of conducting fire and movement and executing actions on contact. During the AAR following a PRIME exercise, unit leaders could use the CGI Graphics Map Display to illustrate

how the platoon executed the wedge formation and provide corrective feedback. They could also replay the TSV tapes to review and critique the platoon's radio communications. Using these training feedback capabilities of PRIME, however, would add very little additional information to what the commander would be able to present based on his own observations. Given the limited training time available at PRIME, the task of executing a wedge formation, more than likely, would be secondary to the unit commander's primary objective of training the more complex tasks (i.e., conducting fire and movement).

(3) When selecting the tasks for PRIME training, unit leaders should concentrate on those tasks rated highly enhanced by PRIME (see Table 2-1). Tasks that are rated as enhanced by PRIME and can be performed at the site should be selected and integrated with PRIME training, wherever possible. For tasks that are rated as not supported for training with PRIME, unit leaders should select and use alternative training approaches.

Table 2-1. Tasks Highly Enhanced by PRIME

T&EO #	Collective Task
17-3-0105	Employ command and control measures
17-3-0217	Perform platoon fire and movement
17-3-0219	Perform an attack by fire
17-3-0220	Assault an enemy position
17-3-0221	Execute actions on contact
17-3-0223	Displace to a subsequent battle position
17-3-0225	Execute a platoon defensive mission

(4) As unit leaders gain experience using PRIME they should supplement and revise the listing in Appendix A. The notes and suggestions presented in the appendix apply to specific collective tasks. Some general considerations that may impact on the selection of tasks for PRIME training are described in the following paragraphs.

(a) One of the strengths of PRIME is its capability to support practice of command and control skills. Thus, tasks involving such skills are generally good candidates for training using the system. The platoon task of employ command and control measures (17-3-0105) is an example of such a task. Each subtask has the leader employing command and control measures (e.g., terrain index reference system (TIRS), target reference points (TRPs) and engagement areas) within the context of the training scenario.

(b) Another strength of PRIME is its capability to support practice of maneuver skills. Tasks involving execution of formations or fire and movement should receive strong consideration for training with PRIME. Units performing such tasks with the PRIME system should include the supporting tasks of using hand-and-arm signals.

(c) Virtually all tactical planning tasks can be performed in conjunction with PRIME exercises. These tasks can and should be performed before a PRIME training exercise begins. Some planning tasks (e.g., resupply plans) cannot be executed on PRIME and will require unit leaders to develop contingency plans.

(d) PRIME allows units the opportunity to employ fire support (artillery, mortars, and close air support (CAS)). However, without the realism of actually receiving fire support, the unit can only simulate its occurrence at the time and place requested. This can be done in the same manner as in other field exercises (i.e., the controller throws the pyrotechnic simulators at the location of the indirect fire).

(e) Some combat service support tasks can also be performed in conjunction with the use of PRIME. However, in terms of the constraints it places on maximum utilization of the site for training purposes, the actual performance of these tasks is limited. Tasks that require the performance of logistically resupplying ammo, for example, should not be performed at PRIME.

d. Develop PRIME training exercises. Once the unit has selected the tasks to be trained using PRIME, the next step in the planning process is to develop the PRIME training exercises. There are no fixed or canned training exercises or scenarios to be run on PRIME. PRIME exercises must be designed and developed to meet the unit's training requirements or objectives. They should include, among other things, the mission objectives and conditions as described in the OPORD, target characteristics and location, and the placement of obstacles. Unit leaders should develop PRIME training exercises using the information contained in the appropriate ARTEP MTPs. Additionally, they can review the training exercises developed by other units and modify them to meet their particular training objectives. Information unit leaders should consider in planning and developing PRIME training exercises is presented in the following paragraphs.

(1) Unit leaders should plan PRIME training exercises as combined arms operations so that the unit can train as it is organized for combat. Combat support and combat service support should be integrated with PRIME training exercises based upon the training needs of the unit and capabilities of the system.

(2) Unit leaders should plan PRIME training exercises so that they incorporate the concept of multi-echelon training. The training matrixes in ARTEP 17-237-10-MTP are designed to aid units in the planning of platoon training. They are provided to show the relationships among individual tasks, collective tasks (T&EOs), tactical operations (STXs), and platoon missions (FTXs).

(3) Unit leaders should plan PRIME training exercises so that they are integrated in the unit's overall training program. For example, they can schedule PRIME training as part of the preparation for other field exercises (e.g., Combat Maneuver Training Complex (CMTC) rotation). This would allow the unit to

begin training at a higher proficiency level for certain skills, such as tactical movement. They can also schedule PRIME to support the remedial training of tasks that are untrained or partially trained through other methods. Additionally, they can schedule PRIME to sustain the performance of critical combat skills when other training support is not available.

(4) Unit leaders should plan PRIME training exercises so that specific training events are included to meet established training objectives. For example, a command field exercise (CFX) might be planned if the training objective focuses on the command and control skills among leaders. A training objective that relates to changing platoon formations might lead to the planning of a battle drill.

(5) Unit leaders should develop PRIME training exercises based on exercises from appropriate ARTEP MTPs, including the identification of target vehicle requirements and the preparation of OPORDs and FRAGOs. For example, existing STXs can be modified to fit the capabilities and limitations of PRIME. In doing this, unit leaders may need to conduct a reconnaissance of the PRIME range or battleground.

(6) Unit leaders should develop PRIME training exercises that are realistic and battle-focused. Training exercises that can be conducted using PRIME include gunnery tables, tactical tables, battle drills, STXs, and tactical exercises without troops (TEWTs).

(7) Unit leaders should develop PRIME training exercises so that they train several collective tasks on PRIME. As such, training objectives are developed for each task performance. The conditions and standards for most major collective training tasks are identified in appropriate ARTEP MTPs. Unit leaders may have to modify the conditions, however, to fit the capabilities of PRIME. If tasks trained using PRIME cannot meet the ARTEP MTP standards, training on the tasks will have to be supplemented through alternative methods.

e. Coordinate training with PRIME site staff. The final step in the planning process is to coordinate training with the Range Operations Manager of PRIME. Unit leaders should begin this coordination early in the planning process, including the scheduling and completion of orientation training as described in paragraph 2.3, picking up necessary materials, and completing planning documents. Coordinating requirements that unit leaders should consider are presented in the following paragraphs.

(1) Unit commanders should indicate the desired levels (individual, crew, platoon) of training, tactical operation center (TOC) requirements, and provide primary and alternate training dates. On notification of approved training dates, the commander should schedule PRIME orientations for all key unit leaders.

(2) Unit leaders should review the PRIME User's Guide, SOPs, operator's manuals, and other materials available at the PRIME site. They should also obtain PRIME planning guidance and materials from the Range Operations Manager as soon as possible, but not less than 10 working days prior to the confirmed training date. Examples of materials to be picked up include PRIME maps and the radio frequencies for command and operations nets.

(3) Unit leaders should prepare OPORDs, overlays and detailed instructions for the range set-up. OPORDs and overlays should be prepared by the unit as soon as possible. In preparing the range set-up instructions, it's very important that unit leaders include as much detail as possible. This will allow the PRIME training exercises to start as the unit desires. PRIME site staff will be available to assist and advise unit leaders in preparing required documents. As a general rule, unit leaders should provide the PRIME staff with the following instructions for setting-up the range:

(a) Type of weapon system per vehicle and target.

(b) Weapon loads for the targets and vehicles.

(c) Targets to present in the exercise.

(d) Depleting target array.

(e) Target locations.

(f) Target presentation areas.

(g) Target shoot-back time (the time delay between target presentation and target shoot back).

(h) Target-up time (the total time a target will remain presented if it has not been killed).

(i) Target-down time (the total time a target will remain down prior to being resurrected).

(j) Target link to other targets (the ability to control multiple target presentations [slave] based on the presentation of a specific target [master]) with the same TPA.

(4) Unit leaders should conduct a PRIME pre-operations meeting with the Range Operations Manager not less than five working days prior to the confirmed training date. They should bring duplicate copies of OPORDs, overlays, instructions and any other planning documents to this meeting, leaving one copy of each with the Range Operations Manager. The PRIME staff will review the planning documents with the unit to make sure that all essential information is provided, resolve conflicts and make arrangements for completing any other requirement not previously planned.

(6) Unit leaders should coordinate any last minute changes in the range set-up instructions for the unit's training exercise with the Range Operations Manager as soon as possible, but not less than twenty-four hours prior to the start of the training period. This will allow the PRIME support staff to properly initialize the PRIME C&C subsystem's RCC before unit training is scheduled to begin.

2.6 Implementing PRIME Training. Depending on the multi-echelon training planned by a unit, one or more PRIME training exercises should be completed per platoon during a PRIME training day. The specific events and activities that occur during a PRIME training exercise are mainly determined by the unit's training plans. The general activities that should occur before, during and after each training exercise are described in the following paragraphs.

a. PRIME Support Staff.

(1) The C&C systems PRIME computer operator will ensure that the unit's training exercise is initialized and all PRIME subsystems are operating. At the conclusion of each exercise, the computer operator will download the exercise data onto a diskette and provide it to the AAR coordinator. He will also provide a copy of the computer printouts, as requested by the unit commander.

(2) The target servicers will ensure that all target lifters are properly serviced, positioned and have the unit's designated targets mounted. Visual and physical checks of the targets will be conducted periodically during the training day. Because PRIME is not a live-fire range, target servicers will not have to close the range or disrupt unit training to make these checks.

(3) The technicians will ensure that the TSVs and PRIME components are properly installed and functioning in each vehicle. Before the start of a unit's exercise, the technicians will load a tape into each TSV VCR and place the camera and VCR into the record mode. At the end of an exercise, the technicians will collect the tapes and provide them to the AAR coordinator.

(4) The AAR coordinator will ensure that the AAR facility is properly set up, the AAR equipment is functioning and all training exercise data are available for a unit to conduct its AARs. The AAR coordinator will load the TSV tapes into the VCRs and the RCC diskette into the AAR computer. He will also assist and advise unit leaders in preparing and conducting their AARs.

b. Unit

(1) Unit leaders will execute the PRIME training exercise in accordance with the unit's range set-up instructions (initialization data). They will also dictate the pace and conduct of training.

(2) Unit leaders, with the assistance of the AAR coordinator, will be responsible for conducting all AARs.

(3) Crew members will inform the support staff (technicians) of any equipment problems, in accordance with the PRIME site SOP.

(4) The unit will clear and police the PRIME site on completion of training, in accordance with the PRIME site SOP.

2.7 Evaluating PRIME Training.

a. During action observation. Unit leaders should position themselves where they can best observe the unit during each PRIME training exercise. For example, the unit commander can follow the platoon, be positioned at selected vantage points, or be at the PRIME Range Operations Facility to listen and monitor the unit's performance on the CGI Graphics Map Display. Other personnel can be positioned on the range to observe the unit's ability to maneuver tactically from an enemy's perspective. If available, hand-held or tripod-mounted video cameras and VCRs can be used to record the enemy's viewpoint for playback and review with platoon leaders and crews as part of their AAR. Unit leaders that follow the platoon or position themselves on the battlefield, even though they do not face the same constraints on PRIME as they would in combat or live-fire ranges, should not interfere in the training exercise.

b. During action review (DAR). PRIME training exercises should be conducted at a pace consistent with the unit's training objectives. DARs should be done without a break in the action yet provide immediate performance feedback to participants. Unit commanders can stop and restart an exercise, but this should be done only if it has reached the point where little or no useful training is being accomplished. In such situations, vehicles that are "killed" can be replaced instead of having crews waiting for the training exercise to be completed.

c. After action review (AAR). The unit commander and key unit leaders should preview the PRIME training exercise data with the AAR coordinator. Together, they can select events that need to be highlighted during the AAR using the computer printouts, CGI Graphics Map Display and TSV tapes. AARs, as described in FM 25-100, Training the Force, should be conducted in four parts:

(1) Establish what happened. Unit leaders and soldiers should try to establish what really happened during performance of a PRIME exercise. The computer printouts and selected parts of the CGI Graphics Map Display can be used to describe the flow of events and discuss significant outcomes. The TSV tapes can be used to review what happened from each tank's point of view.

(2) Determine what was right or wrong with what happened. The soldiers should establish the strong and weak points of their performance. Unit leaders should play a critical

role by guiding the discussions so that the conclusions reached by the soldiers are doctrinally sound, consistent with Army standards, and relevant to the PRIME training exercise.

(3) Determine how the tasks should be done differently the next time. Unit leaders should lead the group in determining how they should perform differently the next time the tasks are performed either on PRIME or in future STXs/FTXs. Unit leaders should use this opportunity to maintain unit morale and increase soldier motivation. This will permit units to conduct future training exercises at higher and desired levels of proficiency.

(4) Perform the tasks again. Unit leaders should know that not all tasks will be performed to desired standards on the first attempt of a PRIME training exercise. Thus, unit leaders should plan to repeat training exercises during the time the unit is at the PRIME site. PRIME exercise should be repeated as soon as possible. This will allow individual, crew and units to apply the lessons learned during the AAR into corrective actions.

2.8 Summary of Responsibilities.

a. PRIME support staff.

(1) Provide orientations to user. The PRIME support staff will provide a first time user orientation and refresher training for key unit leaders. These orientations will be scheduled by the unit with the Range Operations Manager.

(2) Initialize the PRIME system. The PRIME support staff will initialize the C&C subsystem's RCC in accordance with the range set-up instructions provided by the unit commander. The system will be initialized at the start of an exercise and, at the discretion of unit commander, stopped and reinitialized during an exercise. The timing of the initialization will be controlled by the unit and accomplished within range parameters.

(3) Provide training support and assistance. The PRIME staff will support and assist the unit through all phases of training. The staff will assist the unit in preparing planning documents and setting up the range, developing training exercises that best support the unit's training requirements, conducting individual, crew and platoon-level training using PRIME, and providing performance evaluation and feedback during the AAR.

(4) Operate and maintain the PRIME site. The PRIME support staff will operate the site in strict accordance with established policies and SOPs. The staff will also ensure that all PRIME equipment operates and is properly maintained and serviced so as not to adversely affect unit training.

b. Unit personnel.

(1) Schedule PRIME Training. Unit commanders will schedule the PRIME site using the same procedures as for any

other range or training area. Scheduling and coordinating the use of the site for training should be done as far in advance as possible with the Range Operations Manager. This will allow the PRIME support staff to set up the range and complete all the preliminary arrangements necessary to properly support the unit and its training.

(2) Complete PRIME orientations. Key unit leaders will complete the orientation prior to their use of PRIME for training. This orientation will provide instructions on how the system operates, the equipment components that make up the system, the equipment located at the AAR facility for providing performance feedback, the maneuver area and site facilities, the capabilities and limitations of the system for unit training, and initial guidance on how to plan, conduct and evaluate PRIME training exercises. Prime User Guides, SOPs, operator manuals, and diagrams showing the range layout and site facilities will also be made available as part of the orientation program.

(3) Determine and select tasks for PRIME training. Unit leaders will determine the unit's training requirements based on an assessment of unit proficiency with desired performance levels contained in ARTEP MTPs and other documents. They will select tasks to be trained using PRIME based on a review of the training capabilities and limitations of the PRIME system and alternative training methods.

(4) Plan and develop PRIME exercises. Unit leaders will plan and develop PRIME training exercises based on tasks selected for PRIME training. Because the PRIME site can be configured to train a wide variety of tasks, the Range Operations Manager will assist unit leaders in preparing the required OPORDS, overlays and detailed instructions for setting up the range. He will also provide the unit leaders with examples of training exercises that have been successfully accomplished on the range by other units.

(5) Conduct and evaluate PRIME training. Unit leaders will be solely responsible for the conduct and evaluation of the unit's PRIME training. The AAR coordinator will provide the unit with the training exercise data and assist unit leaders in the preparation and conduct of their AARs using the CGI Graphics Map Display and TSV tapes.

(6) Use PRIME site in accordance with SOP. Units will be responsible for using the PRIME site in accordance with SOPs and established policies. PRIME support staff will brief unit leaders on these policies and provide them copies of the SOPs.

2.9 Recommendations.

(1) Make sure your unit is fully prepared for PRIME training. Know precisely what you want to train and ensure unit personnel have the prerequisite skills needed to conduct such training.

(2) Don't use PRIME to train the basics of individual or platoon tactics and gunnery. These basic skills can be developed in the classroom, on a terrain table or using other less costly simulations.

(3) Focus PRIME training on your objectives, but be watchful of key opportunities for additional learning.

(4) Use PRIME and its battlefield environment to sharpen and increase unit proficiency in critical combat skills.

(5) Make sure your unit leaders take full advantage of PRIME's data collection and feedback capabilities for conducting AARs. Encourage them to make maximum use of the AAR coordinator.

(6) Take the TSV tapes back to the unit after PRIME training is completed. Arrange for your master gunners to review the TSV tapes and provide feedback to platoon leaders/sergeants and vehicle crews.

(7) Use the results of PRIME training to determine your unit's future training emphasis.

REFERENCES

Department of the Army (1988). Tank combat tables, M1 (FM 17-12-1). Washington, DC: Author.

Department of the Army (1988). Mission training plan for the tank platoon (ARTEP 17-237-10 MTP). Washington, DC: Author.

Department of the Army (1988). Training the force (FM 25-100). Washington, DC: Author.

U.S. Army Armor School (1988). Armor training device macrostrategy (Draft) (TC 17-12-7). Fort Knox, KY: Author.

U.S. Army, III Corps, G-3 Training (1988). Phantom Run instrumented MILES enhanced (PRIME) system capabilities overview (Draft). Fort Hood, TX: Author.

APPENDIX A

TANK PLATOON TRAINING CAPABILITIES

A-1. General. This appendix contains the suggested task lists for training on PRIME for the tank platoon. This list was developed using the applicable ARTEP Mission Training Plan.

a. Following each task is a rating of HIGH, PARTIAL or MINIMAL indicating the level of enhancement to training. These ratings are derived as follows:

HIGHLY ENHANCED (HE) - All subtasks can be trained on the range using the PRIME system. The PRIME system provides the commander enhancements to his evaluation and feedback capability on the majority of the subtasks.

PARTIALLY ENHANCED (PE) - Most subtasks can be trained on the range using the PRIME system. The PRIME system provides the commander enhancements to his evaluation and feedback capability on some of the subtasks.

MINIMALLY ENHANCED (ME) - Some of the subtasks can be trained on the range using the PRIME system.The PRIME system provides very little help to the commander.

PRIME NOT REQUIRED (NR) - The task can be performed on the PRIME site but the PRIME system is not required to train the task.

NOT SUPPORTED (NS) - The task cannot be performed on the range or on the site.

b. With each rating, the appendix provides notes on task performance, problems and limitations using PRIME and, where applicable, suggestions for working around the problems or limitations.

Training Matrix

COMMAND, CONTROL AND COMMUNICATIONS

T&EO #	Collective Task	Rating HE/PE/ME/NR/NS	Training Notes
17-3-0100	Perform tactical planning	NR	All subtasks can be supported within a PRIME scenario. However, the PRIME system is not involved in the planning portion. Prime supports the execution of the order.
17-3-0101	Prepare for tactical operations	NR	All subtasks can be supported within a PRIME scenario. However, the PRIME system is not involved in the preparation portion of the scenario.
17-3-0102	Perform precombat checks	NR	All subtasks can be supported within a PRIME scenario. Some changes must be made to the normal precombat checks so that the PRIME subsystems on the tanks can be checked out. The PRIME system does have some enhancements in checking out the accuracy of the MILES system.
12-3-C021	Perform reorganization activities	NR	The platoon can go through the consolidation operations for both offense and defense. The reorganization operations would have to be simulated to a large degree. PRIME scenarios could incorporate this task to allow for very good training on this task.
17-3-0103	Employ electronic counter-countermeasures	NR	All subtasks can be performed within a PRIME scenario.
17-3-0104	Produce a platoon fire plan	NR	All subtasks can be performed within a PRIME scenario.

COMMAND, CONTROL AND COMMUNICATIONS (Continued)

T&EO #	Collective Task	Rating HE/PE/ME/NR/NS	Training Notes
17-3-0105	Employ command and control measures	HE	All training on subtasks with the exception of #2 and #6 can be highly enhanced with the PRIME system. Commander could support subtask #2 by providing dummy traffic control on the company and battalion net. Subtask #6 can only be partially supported because of the difficulty in simulating indirect fires. The TSV subsystem records all communications. Replay of the tapes at critical places can illustrate performance.
		MANEUVER	
17-3-0200	Perform assembly area activities	NR	All subtasks can be performed in preparation for a PRIME scenario. However, use of the active range would normally not be the most beneficial use of PRIME.
17-3-0201	Execute a coil formation	NR	All subtasks can be performed on or near the PRIME site in preparation or preliminary to conducting the range portion of the PRIME scenario. However, use of the active range would not normally be the most beneficial use of PRIME. PRIME does best when contact does occur. The TSV tapes can be used to review communications.
17-3-0202	Execute a herringbone formation	NR	All subtasks can be performed on or near the range site in preparation or preliminary to conducting the range portion of the PRIME scenario. However, use of the active range would not be the most beneficial use of PRIME. Conditions for this task indicate that enemy contact is not likely.

MANEUVER (Continued)

T&EO #	Collective Task	Rating HE/PE/ME/NR/NS	Training Notes
17-3-0203	Execute a column formation	NR	All subtasks can be performed on or near the range site in preparation or preliminary to conducting the range portion of the PRIME scenario. However, use of the active range would not be the most beneficial use of PRIME. Conditions for this task indicate that enemy contact is not expected. PRIME does best when contact does occur. The TSV tapes can be used to review communications. The computer graphics map can be used to provide a visual display of the task performance
17-3-0204	Execute a staggered column formation	NR	All subtasks can be performed on or near the range site in preparation or preliminary to conducting the range portion of the PRIME scenario. However, use of the active range would not be the most beneficial use of PRIME. Conditions for this task indicate that enemy contact is not expected. PRIME does best when contact does occur. The TSV tapes can be used to review communications. The computer graphics map can be used to provide a visual of the task performance.
17-3-0205	Execute a wedge formation	NR	All subtasks can be enhanced within a PRIME scenario. Conditions for this task indicate that enemy contact is possible. PRIME does best when contact does occur. The TSV tapes can be used to review communications. The computer graphics map can be used to provide a visual display of task performance.

MANEUVER (Continued)

T&EO #	Collective Task	Rating HE/PE/ME/NR/NS	Training Notes
17-3-0206	Execute a vee formation	NR	All subtasks can be enhanced within a PRIME scenario. Conditions for this task indicate that enemy contact is possible. PRIME does best when contact does occur. The TSV tapes can be used to review communications. The computer graphics map can be used to provide a visual display of task performance.
17-3-0207	Execute a line formation	NR	All subtasks can be enhanced within a PRIME scenario. Conditions for this task indicate that enemy contact is possible. PRIME does best when contact does occur. The TSV tapes can be used to review communications. The computer graphics map can be used to provide a visual display of task performance.
17-3-0208	Execute an echelon formation	NR	All subtasks can be enhanced within a PRIME scenario. Conditions for this task indicate that enemy contact is possible. PRIME does best when contact does occur. The TSV tapes can be used to review communications. The computer graphics map can be used to provide a visual display of task performance.
17-3-0209	Execute traveling	NR	All subtasks can be enhanced within a PRIME scenario. Conditions for this task indicate that enemy contact is not likely and speed is essential, or the platoon is operating in a tactical environment and is overwatched by a unit where contact is possible and speed is essential. PRIME does best when contact occurs. The TSV tapes can be used to review communications. The computer graphics map can be used to provide a visual display of task performance.

MANEUVER (Continued)

T&EO #	Collective Task	Rating HE/PE/ME/NR/NS	Training Notes
17-3-0210	Execute traveling overwatch	NR	All subtasks can be enhanced within a PRIME scenario. Conditions for this task indicate that enemy contact is possible. PRIME does best when contact does occur. The TSV tapes can be used to review communications. The computer graphics map can be used to provide a visual display of the task performance.
17-3-0211	Execute bounding overwatch	NR	All subtasks can be enhanced within a PRIME scenario. Conditions for this task indicate that enemy contact is expected. PRIME does best when contact does occur. The TSV tapes can be used to review communications. The computer graphics map can be used to provide a visual display of the task performance.
17-3-0212	Conduct a tactical roadmarch	NR	All subtasks can be enhanced within a PRIME scenario. Conditions for this task indicate that enemy contact is not expected. PRIME does best when contact does occur. The TSV tapes can be used to review communications. The computer graphics map can be used to provide a visual display of the task performance.
17-3-0213	Move in a built-up area	ME	Subtasks cannot be supported unless range facilities have a built-up area or military operations on urbanized terrain (MOUT) site. Currently, the PRIME system does not support dismounted infantry or multiple infantry targets. The TSV and computer graphics map could be used to provide feedback on communications, movement, command and control, and direct-fire support from subtasks #2 and #3.

MANEUVER (Continued)

T&EO #	Collective Task	Rating HE/PE/ME/NR/NS	Training Notes
17-3-0214	Assist in a passage of lines	NR	Subtasks can be supported as part of a PRIME scenario either totally on the range or entry onto the range. Conducted totally on the range is inefficient since it does not involve actual use of the PRIME system. Platoon could conduct a passage of lines at the edge of range and move down from that point.
17-3-0215	Perform a passage of lines	NR	Subtasks can be supported as part of a PRIME scenario either totally on the range or entry onto the range. Conducted totally on the range is inefficient since it does not involve actual use of the PRIME system. Platoon could conduct a passage of lines at the edge of range and move down from that point.
17-3-0216	Conduct rehearsals for a mission	NR	Conducting a rehearsal as part of the preparation for a PRIME course run is excellent preparation for the exercise. A platoon's leaders failure to allow sufficient time to conduct a rehearsal would constitute a serious deficiency.
17-3-0217	Perform platoon fire and movement	HE	PRIME provides an excellent opportunity to train and evaluate task performance. Since PRIME scenarios are easy to change and target presentation is based on vehicle location, course runs cannot be memorized by the platoon. Although indirect fires cannot be simulated well, the platoon leader or platoon sergeant can still request the fires.

MANEUVER (Continued)

T&EO #	Collective Task	Rating HE/PE/ME/NR/NS	Training Notes
17-3-0218	Perform reconnaissance by fire	PE	Indirect fire is currently not well simulated on PRIME. Operator can be cued to raise targets if reconnaissance by fire would have been in the proximity of the target.
17-3-0219	Perform an attack by fire	HE	Indirect fire is not well simulated on PRIME. PRIME targetry can be positioned and operated to simulate an OPFOR defensive position.
17-3-0220	Assault an enemy position	HE	All subtasks can be supported within a PRIME scenario and provide enhanced feedback capabilities to the commander.
17-3-0221	Execute actions on contact	HE	All subtasks can be supported within a PRIME scenario and provide enhanced feedback capabilities to the commander.
17-3-0222	Occupy a platoon battle position	NR	All subtasks training can be enhanced within a PRIME scenario. Conditions of this task indicate that enemy contact is not expected prior to the not later than (NLT)-time specified in the OPORD. PRIME does best when contact does occur. The TSV tapes can be used to review communications. The CGI graphics map can be used to provide a visual display of the task performance.
17-3-0223	Displace to a subsequent battle position	HE	All subtasks can be supported within a PRIME scenario and enhances the commander's capability of providing the unit with detailed and usable feedback.

MANEUVER (Continued)

T&EO #	Collective Task	Rating HE/PE/ME/NR/NS	Training Notes
17-3-0224	React to an enemy dismounted attack	PE	All subtasks can be supported within a PRIME scenario. The PRIME system currently does not support multiple dismounted targets.
17-3-0225	Execute a platoon defensive mission	HE	All subtasks can be supported within a PRIME scenario and enhances the commander's capability of providing the unit with detailed and useable feedback.
17-3-0226	Assist a relief in place	NR	Although all the tasks can be done on the PRIME site, the PRIME systems are not really being used. User may be able to perform the tasks either before or at end of course run. Conditions indicate contact is possible, but not expected. PRIME does best when contact does occur. The TSV tapes can be used to review communications. The computer graphics map can be used to provide a visual display of the task performance.
17-3-0227	Conduct hasty occupation of a battle position	NR	All subtasks can be supported within a PRIME scenario. User must ensure coordination is made concerning any restrictions on improving the position. Conditions for this task indicate that enemy contact is not expected before the "defend-NLT" time specified in the OPORD. PRIME does best when contact does occur. The TSV tapes can be used to review communications. The computer graphics map can be used to provide a visual display of the task performance.

INTELLIGENCE AND ELECTRONIC WARFARE

T&EO #	Collective Task	Rating HE/PE/ME/NR/NS	Training Notes
17-3-0301	Employ camouflage and counter-surveillance measures	NR	Conditions for this task indicate that the threat is capable of ground or air surveillance, but enemy ground contact is not expected. A hand-held or down-range camera can be used to record and demonstrate the effectiveness of camouflage.
17-3-0302	Establish an observation post	NR	Although all subtasks can be done on a PRIME site, performance of the task would not be taking advantage of PRIME. This task would be better trained in adjacent area.
19-3-C004	Process enemy prisoners of war	NR	All subtasks can be performed while on a PRIME site. Enemy prisoners of war (EPW) tasks can be incorporated to provide for a smooth flowing exercise with realistic events. Most subtasks would be better trained in an adjacent area.
19-3-C005	Process captured documents and equipment	NR	All subtasks can be performed while on a PRIME site. User can develop scenarios that incorporate this task to provide a more realistic situation. Most subtasks would be better trained in an adjacent area.

MOBILITY, COUNTERMOBILITY AND SURVIVABILITY

17-3-0401	Take actions at an obstacle	NR	All subtasks can be performed within a PRIME scenario. However, range and safety restrictions may prohibit use of smoke grenades in subtask 3.

MOBILITY, COUNTERMOBILITY AND SURVIVABILITY (Continued)

T&EO #	Collective Task	Rating HE/PE/ME/NR/NS	Training Notes
17-3-0402	Execute a prepared obstacle	NR	All subtasks can be performed within a PRIME scenario. However, three of the seven subtasks must be simulated because of range and safety restrictions.
17-3-0403	Construct a hasty obstacle	NR	Although the task can be performed on the PRIME site, performing the tasks on the range would not be the most effective use of the range's capabilities.
17-3-0404	Emplace a hasty minefield	NR	Although the task can be performed on the PRIME site, performing the tasks on the range would not be the most effective use of the range's capabilities.
03-0-C011	Prepare for a chemical attack	NR	Although the task can be performed on the PRIME site, performing the tasks on the range would not be the most effective use the range's capabilities.
03-3-C018	Prepare for a friendly nuclear strike	NR	Although the task can be performed on the PRIME site, performing the tasks on the range would not be the most effective use the range's capabilities.
03-3-C-12	Prepare for a nuclear attack	NR	Although the task can be performed on the PRIME site, performing the tasks on the range would not be the most effective use the range's capabilities
17-3-0408	Respond to initial effects of a nuclear attack	NR	Although the task can be performed on the PRIME site, performing the tasks on the range would not be the most effective use the range's capabilities.

MOBILITY, COUNTERMOBILITY AND SURVIVABILITY (Continued)

T&EO #	Collective Task	Rating HE/PE/ME/NR/NS	Training Notes
17-3-0409	Respond to the residual effects of a nuclear attack	NR	Although the task can be performed on the PRIME site, performing the tasks on the range would not be the most effective use the range's capabilities.
03-3-C013	Cross a radiologically contaminated area	NR	Although the task can be performed on the PRIME site, performing the tasks on the range would not be the most effective use the range's capabilities.
03-3-C015	Respond to a chemical agent attack	NR	Although the task can be performed on the PRIME site, performing the tasks on the range would not be the most effective use the range's capabilities.
17-3-0412	Conduct chemical reconnaissance	NR	Although the task can be performed on the PRIME site, performing the tasks on the range would not be the most effective use the range's capabilities.
03-3-C034	Cross a chemically contaminated area	NR	Although the task can be performed on the PRIME site, performing the tasks on the range would not be the most effective use the range's capabilities.
03-3-C016	Perform chemical decontamination	NR	Although the task can be performed on the PRIME site, performing the tasks on the range would not be the most effective use the range's capabilities.

COMBAT SERVICE SUPPORT

T&EO #	Collective Task	Rating HE/PE/ME/NR/NS	Training Notes
17-3-0601	Perform resupply operations	NR	Although the task can be performed on the PRIME site, performing the tasks on the range would not be the most effective use the range's capabilities.
08-3-C019	Prepare and evacuate casualties	NR	Although the task can be performed on the PRIME site, performing the tasks on the range would not be the most effective use the range's capabilities.
17-3-0603	Perform maintenance operations	NR	Although the task can be performed on the PRIME site, performing the tasks on the range would not be the most effective use the range's capabilities.
08-3-C023	Perform field sanitation operations	NR	This task should be performed as a matter of course when in the field. The use of catholes may not be allowed on the site.

AIR DEFENSE

44-3-C001	Take passive air defense measures	NR	All the subtasks can be performed while on PRIME. PRIME does not provide any added features that can aid in training the task.
44-3-C002	Take active air defense measures against hostile aircraft	ME	User can simulate most subtasks. PRIME does not offer any added simulation. High performance aircraft may be required to practice subtasks 3 and 4. Current MILES equipment does not allow the simulated engagement of high performance aircraft.

GLOSSARY

AAR	after-action review
ARI	Army Research Institute for the Behavioral and Social Sciences
ARTEP	Army Training and Evaluation Program
ATTS	automatic tank target system
BFV	Bradley fighting vehicle
BMP	Soviet mechanized infantry combat vehicle
C&C	command and control
CAS	close air support
CLS	contract logistics support
CFX	command field exercise
CGI	computer generated imagery
CMTC	combat maneuver training complex
DA	Department of Army
DAR	during-action review
DOTD	Directorate of Training and Doctrine
EPW	enemy prisoner of war
FM	field manual
FRAGO	fragmentary order
FTX	field training exercise
GPS	global positioning system
GPSE	gunner primary sight extension
G3	Assistant Chief of Staff for operations and plans
I-MILES	improved multiple integrated laser engagement system (MILES)
LTID	laser target interface device
METL	mission-essential task list
MILES	multiple integrated laser engagement system
MOUT	military operation on urbanized terrain
MTP	mission training plan
NLT	not later than
OPORD	operations order
PM TRADE	Project Manager for Training Devices
PGS	precision gunnery system
PRIME	Precision Range Integrated Maneuver Exercise
RCC	range control computer
SOP	standing operating procedure
STX	situational training exercise

T&EO	training and evaluation outlines
TC	training circular
TEWT	tactical exercise without troops
TIRS	terrain index reference system
TOC	tactical operations center
TPA	target presentation area
TRADOC	Training and Doctrine Command
TRP	target reference point
TSV	thru-sight video
TWGSS	tank weapon gunnery simulation system
USAARMS	U.S. Army Armor School
USAREUR	U.S. Army Europe
VCR	video cassette recorder